BMP-37

BMP: TREES, SHRUBS, VINES & GROUND COVERS

Definition

Stabilizing disturbed areas by establishing vegetative cover with trees, shrubs, vines, or ground covers.

Purposes

1. To aid in stabilizing soil in areas where vegetation other than turf is preferred.

2. To provide food and shelter for wildlife where wildlife habitat is desirable.

Conditions Where Practice Applies

1. In areas where turf establishment is difficult.

2. On steep or rocky slopes, where mowing is not feasible.

3. Where ornamentals are desirable for landscaping purposes.

4. Where woody plants are desirable for soil conservation, or to establish wildlife habitat.

Planning Considerations

Disturbed areas may be stabilized in many different ways. Most frequently, a permanent vegetative cover of grasses and legumes is established. There are locations, however, where other types of vegetation are preferred. The following situations are examples of ways in which trees, shrubs, vines, and ground covers may be used:

1. On cut and fill slopes adjacent to paved areas of shopping centers, schools, industrial parks, or other non-residential projects: woody plants and ground covers can be used on these slopes to control erosion. They will also help to control foot traffic, will not require as much maintenance as mowed lawns, and will be more attractive than unmowed grass cover.

2. In residential areas, slopes too steep to be mowed and areas along rights-of-way or easements may be planted in trees, shrubs, vines or ground covers to reduce maintenance and improve appearance.

3. The interested homeowner or small project developer may choose to use ornamental plants in problem areas - shade, steep slopes, inaccessible places - as alternatives to grass. Ground covers may be used to reduce or eliminate the need for mowing grass on level areas.

There are vast numbers of plants that may be used for these purposes. Information on such plants can be obtained from nurserymen, landscape architects, and extension agents.

This practice consists, instead, of a set of general guidelines for growing trees, shrubs, vines, and ground covers on disturbed land.

Guidelines

As noted, disturbed soil between trees and shrubs must be mulched or planted with permanent vegetation to prevent erosion. Refer to the other vegetative practices to select a method for stabilizing these areas.

Trees -

Selecting the Right Trees - In the urban and suburban environment, trees may be exposed to insufficient light and water; high velocity winds; salt from highway ice control programs; heat radiation from roads and buildings; pollutants from cars and industry; root amputation for water, sewer, and gas lines; topping to prevent interference with power lines; and covering of roots by pavement. New species and varieties of trees are being selected for the modern environment on the basis of their ability to withstand those difficult conditions and still provide the benefits associated with having trees (see Figure 37-1).

Selection of trees depends on the desired function of the tree, whether it be shade, privacy screening, noise screening, appearance, enhancement of wildlife habitat, or a combination of these. The following characteristics of the tree should be considered when making choices:

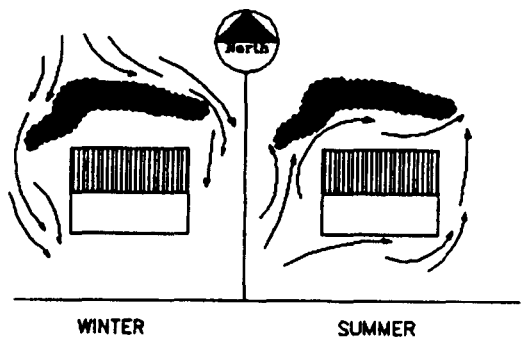
1. Hardiness - "Hardiness zones" are based on average annual minimum temperature.

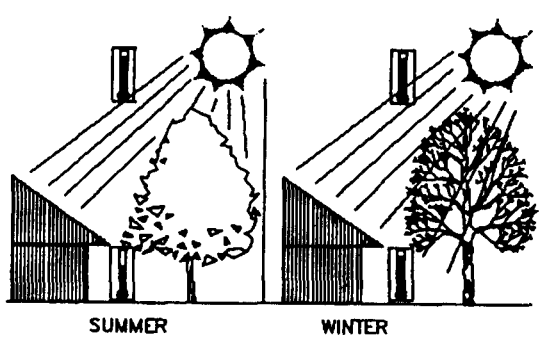
2. Mature height and spread - The eventual height of a tree must be considered in relation to planting location to avoid future problems with power lines and buildings (see Figure 37-2).

FIGURE 37-1: BENEFITS OF TREES

TEMPERATURE MODIFICATION

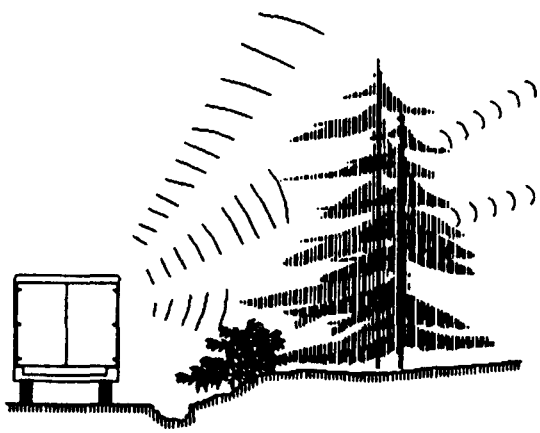
TREES AFFECT WIND SPEED AND DIRECTION, AND THUS TEMPERATURE. FOR EXAMPLE, AN EVERGREEN PLANTING ON THE NORTHWEST SIDE OF A BUILDING WILL REDUCE THE EFFECTS OF HARSH WINTER WINDS AND DIRECT COOL SUMMER BREEZES THROUGH THE AREA. TREES PROTECT THE SOIL FROM DRYING SUN AND WIND, REDUCING EVAPORATION AND MAINTAINING COOLER TEMPERATURES UNDER TREES. WHEN PROPERLY PLACED NEAR BUILDINGS, TREES OF PROPER SIZE WILL INSULATE BUILDINGS FROM EXTREME TEMPERATURE CHANGES IN WINTER AND SUMMER, HELPING REDUCE COSTS OF HEATING AND COOLING. DECIDUOUS TREES BLOCK OUT THE HOT SUMMER SUN, KEEPING THE HOME COOLER, AND ALLOW WARMTH OF WINTER SUN TO PASS THROUGH.





SOUND CONTROL

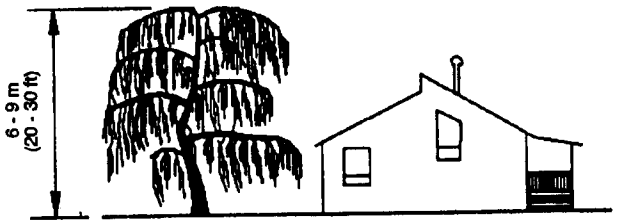
NOISES FROM NEARBY SOURCES CAN BE REDUCED THROUGH PROPER PLACEMENT OF TREES. THE DEGREE OF CONTROL DEPENDS ON THE DENSITY OF THE PLANTING AND INTENSITY AND DIRECTION OF SOUND WAVES. BOTH DECIDUOUS AND EVERGREEN TREES SHOULD BE USED FOR BEST EFFECT.



EROSION CONTROL

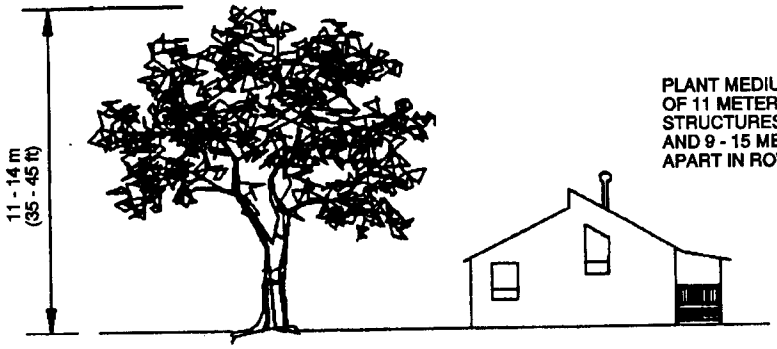
COARSE LEAF TEXTURES, HORIZONTAL BRANCHING HABITS, FIBROUS ROOT STSTEMS, AND ROUGH BARK ARE TREE CHARACTERISTICS MOST EFFECTIVE IN SLOWING WATER MOVEMENT AND WIND SPEED, THUS REDUCING EROSION PROBLEMS.

FIGURE 37-2: SPACING TREES FOR SAFETY AND EFFECTIVE LANDSCAPING



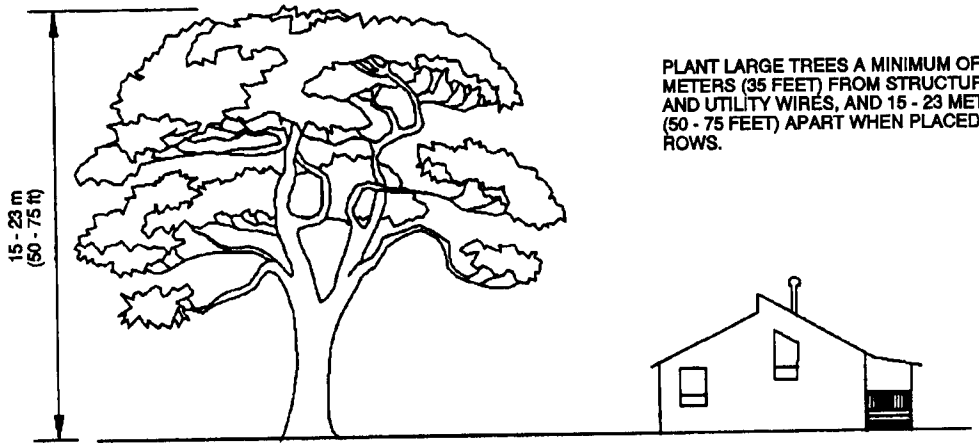
SMALL TREES

PLANT SMALL TREES A MINIMUM OF 4 METERS (12 FEET) FROM STRUCTURES OR UTILITY WIRES. IN ROWS, PLANT THEM 8 METERS (25 FEET) APART.



MEDIUM TREES

PLANT MEDIUM TREES A MINIMUM OF 11 METERS (35 FEET) FROM STRUCTURES AND UTILITY WIRES, AND 9 - 15 METERS (30 - 50 FEET) APART IN ROWS.



LARGE TREES

PLANT LARGE TREES A MINIMUM OF 11 METERS (35 FEET) FROM STRUCTURES AND UTILITY WIRES, AND 15 - 23 METERS (50 - 75 FEET) APART WHEN PLACED IN ROWS.

3. Growth rate - Some trees attain mature height at an early age, others take many years. If "instant shade" is desired, rapid growth is needed. Slow-growing trees are usually less brittle and live longer.

4. Root system - Some trees obstruct underground pipelines with fibrous roots.

5. Cleanliness - Maintenance problems can be avoided by not selecting trees that drop seedpods, flowers, or twigs in large amounts.

6. Moisture and fertility requirements - If good soil and drainage are not available, trees tolerant of poor growing conditions must be planted.

7. Ornamental effects - If a tree is unusually attractive in appearance, some other shortcomings may be overlooked.

8. Evergreen vs. deciduous - Evergreens retain their leaves throughout the year, and so are useful for privacy screens and noise screens. Deciduous trees drop their leaves in fall. They are preferable for shade trees.

At the same time as trees are being selected, the site where they will be planted should be evaluated. Consider the prior use of the land; adverse soil conditions, such as poor drainage or acidity, exposure to wind; temperature extremes; location of utilities, paved areas, and security lighting; and traffic patterns-

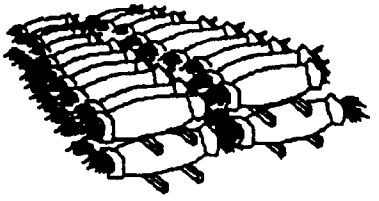
Sources of trees and how they may be bought - Trees are usually available at commercial nurseries as container-grown trees or as balled and burlapped trees. Container-grown trees can be planted at any time of year that the ground is not frozen, if sufficient water is provided. They should be purchased and planted when quite young, less than 50 millimeter (2 inches) diameter trunk, to avoid dealing with root-bound plants.

Balled and burlapped trees are usually larger; check to be sure that soil around roots was dug with the tree and not just packed around bare roots. The soil should have been kept moist.

Tree seedlings are available commercially and are also sold in lots of 50, 100, 500, or 1000 by state forest nurseries. Since 50 seedlings will only plant an area of 275 square meters (3000 square feet), it is permissible to plant fairly small areas as long as the purpose is conservation.

Planting Bare-Rooted Tree Seedlings
When - Trees to be planted as bare-rooted seedlings should be handled only while dormant in spring, or after leaf fall in autumn. Refer to Figure 37-3 for planting instructions.

FIGURE 37-3: PLANTING BARE-ROOTED SEEDLINGS



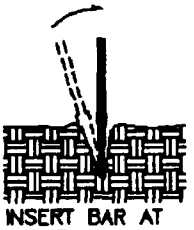
CARE OF SEEDLINGS UNTIL PLANTED

SEEDLINGS SHOULD BE PLANTED IMMEDIATELY. IF IT IS NECESSARY TO STORE MOSS-PACKED SEEDLINGS FOR MORE THAN 2 WEEKS, ONE PINT OF WATER PER PKG. SHOULD BE ADDED. IF CLAY-TREATED, DO NOT ADD WATER TO PKG. PACKAGES MUST BE SEPERATED TO PROVIDE VENTILATION TO PREVENT "HEATING". SEPARATE PACKAGES WITH WOOD STRIPS AND STORE OUT OF THE WIND IN A SHADED, COOL (NOT FREEZING) LOCATION.

CARE OF SEEDLINGS DURING PLANTING

WHEN PLANTING, ROOTS MUST BE KEPT MOIST UNTIL TREES ARE IN THE GROUND. DO NOT CARRY SEEDLINGS IN YOUR HAND EXPOSED TO THE AIR AND SUN. KEEP MOSS-PACKED SEEDLINGS IN A CONTAINER PACKED WITH WET MOSS OR FILLED WITH THICK MUDDY WATER. COVER CLAY-TREATED SEEDLINGS WITH WET BURLAP ONLY.

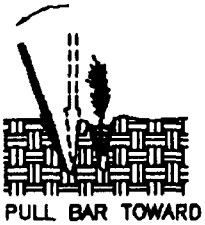
HAND PLANTING



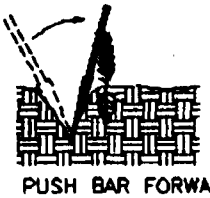
INSERT BAR AT ANGLE SHOWN AND PUSH FORWARD TO UPRIGHT POSITION.

REMOVE BAR AND PLACE SEEDLING AT CORRECT DEPTH.

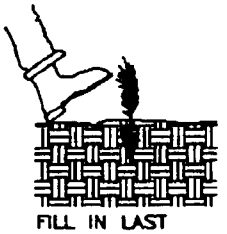
INSERT BAR TWO INCHES TOWARD PLANTER FROM SEEDLING.



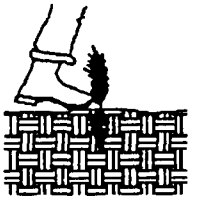
PULL BAR TOWARD PLANTER FIRMING SOIL AT BOTTOM OF ROOTS.



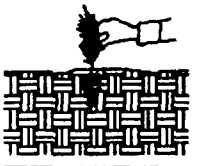
PUSH BAR FORWARD FROM PLANTER FIRMING SOIL AT TOP OF ROOTS.



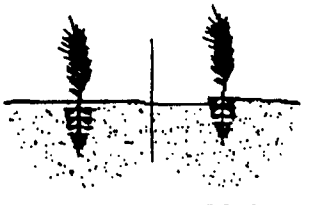
FILL IN LAST HOLE BY STAMPING WITH HEEL.



FIRM SOIL AROUND SEEDLING WITH FEET.



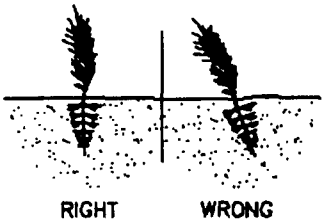
TEST PLANTING BY PULLING LIGHTLY ON SEEDLING.



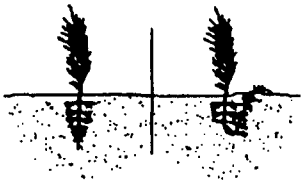
RIGHT WRONG

DON'T EXPOSE ROOTS TO AIR DURING FREEZE OR PLANT IN FROZEN GROUND.

PLANT SEEDLINGS UPRIGHT - NOT AT AN ANGLE.

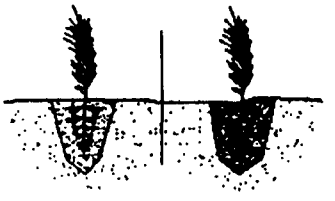


RIGHT WRONG



DO NOT BEND ROOTS SO THAT THEY GROW UPWARDS OUT OF THE GROUND.

ALWAYS PLANT IN SOIL - NEVER LOOSE LEAVES OR DEBRIS. PACK SOIL TIGHTLY.



When stabilizing the disturbed area between tree plantings, do not use grasses or legumes which will overshade the new seedlings. Where possible, a circle of mulch around seedlings will help them to compete successfully with herbaceous plants.

Transplanting Trees (Planting Balled-and-Burlapped and Container-Grown Trees)

When - Hardwoods should be transplanted in the late fall following their leaf drop. There is a single exception to this rule: "Willow" Oaks seem to survive at a greater rate when they are transplanted in the spring. Evergreens may be transplanted beginning with the fall cool down period (normally September) and may continue into spring prior to elongation of the new growth.

Tree preparation - Proper digging of a tree includes the conservation of as much of the root system as possible, particularly the fine roots. Soil adhering to the roots should be damp when tree is dug, and kept moist until planting. The soil (or "root") ball should be 12 millimeters in diameter for each millimeter of diameter of the trunk (12 inches per inch of trunk diameter). The tree should be carefully excavated and the soil ball wrapped in burlap and tied with rope. Use of a mechanical tree spade is also acceptable.

Evergreens, or any trees which are to be transported for a distance, should have the branches bound with soft rope to prevent damage.

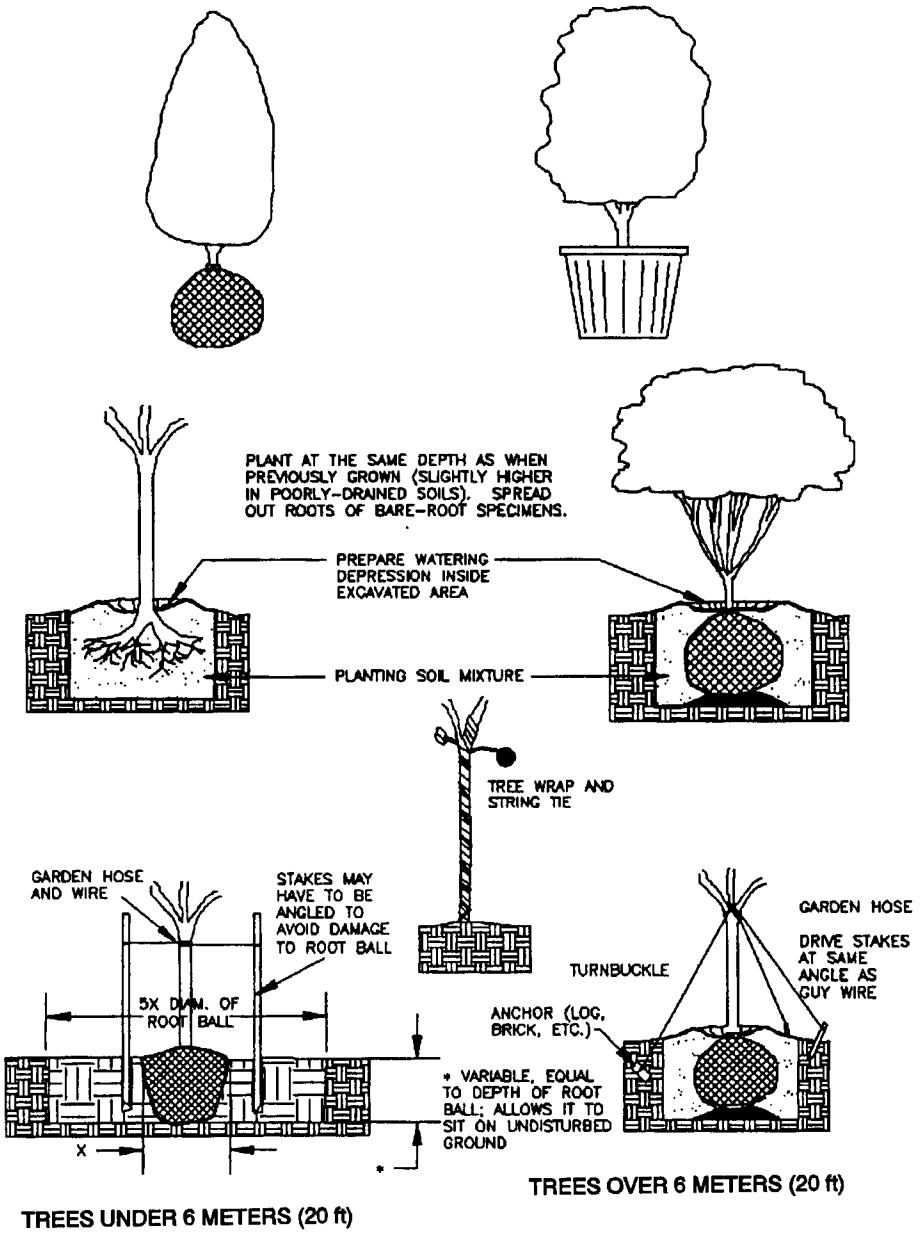
Site Preparation - Rather than digging a planting hole, rototill or loosen with a shovel, a shallow area the depth (height) of the soil ball and the width of five times the diameter of the soil ball or container. Organic material can be added to the loosened soil as long as the new material is used uniformly throughout the area.

Heavy or poorly drained soils are not good growth media for trees. When it is necessary to transplant trees into such soils, extra care should be taken. Properly installed drain tile will improve drainage.

Setting the tree - At the center of the prepared area, dig a shallow hole to set the tree. The hole should allow the root ball to sit on solid ground rather than loose soil. The upper surface of the root ball should be level with the existing soil. The tree may be set just a few millimeters higher than its former location, especially if soil is poorly drained. Do not set the tree lower than it was previously positioned. Soil to be placed around the root ball should be moist but not wet (see Figure 37-4).

Set the tree in the hole and remove the rope which holds the burlap. Cut away the burlap or, at a minimum, push it back into the bottom of the excavation. Do not break the soil of the root ball. Fill the hole with soil half-way, and tamp firmly around the root ball. Add water to settle the soil and eliminate air pockets. When the water has drained off, fill the hole the remainder of the way and tamp as before.

FIGURE 37-4: PLANTING BALLED - & - BURLAPPED & CONTAINER-GROWN TREES



Use extra soil to form a shallow basin around the tree, somewhat smaller than the diameter of the root ball (Figure 37-4). This will be for holding water when the tree is irrigated.

Note: Level the ground and eliminate these basins when winter sets in, as ice forming in the basin might injure the trunk.

Supporting the tree - Newly planted trees may need artificial support, especially in windy areas, to prevent excessive swaying. Stakes or guy wires may be used (see Figure 37-4). Use rubber hose and allow some slack in the guy to encourage strengthening of the plant. Remove all supports within six months of planting.

Watering - Soil around the tree should be thoroughly watered after the tree is set in place. When the soil becomes dry, the tree should be watered deeply but not too often. Mulching around the base of the tree is helpful in preventing roots from drying out.

Maintenance of Tree Plantings - Like all plants, trees require water and fertilizer to grow. Ideally, young trees should receive 25 millimeters (1 inch) of water each week for the first two years after planting. When rain does not supply this need, the tree should be watered deeply but not any more frequent than once per week.

Transplanted trees should be fertilized one year or so after planting. There are many sophisticated ways to supply fertilizer to trees, but some simple methods are adequate. The best material for small trees is well-rotted stable manure, if it can be obtained. Add it as a 50 millimeter (2-inch) layer of mulch around the tree annually. If chemical fertilizers are to be used, a formulation such as 10-8-6 or 10-6-4 is preferred. Use about 0.04 kilograms per each millimeter of trunk diameter (2 pounds per inch of trunk diameter) measured 1 meter (4 feet) from the ground. Thus, if the trunk diameter at 1 meter was 125 millimeters (5 inches), 5 kilograms (10 pounds) of fertilizer would be applied.

> Note: Evergreens - use one-half the recommended amount of chemical fertilizer or use only organic fertilizers such as cottonseed meal, bone meal, or manure.

Fertilizer must come in contact with the roots to benefit the tree. A simple way to insure this is to make holes in the tree's root area with a punchbar, crowbar, or augur. Holes should be 450 millimeters (18 inches) deep, spaced about 600 millimeters (2 feet) apart, and located around the drip line of the tree. Distribute the necessary fertilizer evenly into these holes, and close the holes with the heel of the shoe or by filling with topsoil or peat moss.

Fertilize trees in late fall or in early spring, before leaves emerge.

Shrubs

Much of what has been said about trees also applies to shrubs. A shrub is an erect, woody plant less than 5 meters (15 feet) tall, usually with several trunks rising from a common base. Some have the appearance of small trees, and some lie close to the ground.

Selecting appropriate shrubs - There are so many ornamental shrubs available that advising on the choice of any one is difficult. Shrubs are recommended for conservation planting because they enrich or hold the soil or encourage development of wildlife habitat. Information on other shrubs is available from nurserymen and extension agents.

Follow the general procedure for tree planting when planting shrubs.

Maintenance

Proper pruning, watering, and application of fertilizer every three years or so will keep shrubs, healthy. Maintain the mulch cover or turf cover surrounding the shrubs. A heavy layer of mulch reduces weeds and retains moisture.

VINES AND GROUND COVERS

Low-growing plants that sprawl, trail, spread, or send out runners come in many leaf types, colors and growth habits. Some are suitable only as part of a maintained landscape, and some can stabilize large areas with little care.

In addition to stabilizing disturbed soil, vines and ground covers can perform the following functions:

1. Maintain cover in areas where turf will not thrive.

2. Provide attractive cover that does not need mowing.

3. Help to define traffic areas and control pedestrian movement. People are more likely to walk on the grass than to walk on a thick bed of ivy or a prickly planting of juniper.

Information on vines and other ground cover is available from nurserymen.

Most all ground covers perform best when planted in the spring. Container-grown plants can be planted throughout the growing season if adequate water is provided.

Site preparation - Ground covers are plants that naturally grow very close together, causing severe competition for space, nutrients, and water. Soil for ground covers should be well prepared. A well-drained soil high in organic matter is best.

If the area to be planted is so large that adding amendments to the soil as a whole would be impractical, organic matter may be added only to each planting hole.

Lime and fertilize according to soil test, or add 25 kilograms of 10-10-10 and 50 kilograms of ground agricultural limestone to every 100 square meters (5 pounds and 10 pounds per 100 square feet respectively). Incorporate into the top 100 to 150 millimeters (4 to 6 inches) of the soil. Add organic matter up to one-third of the total soil volume, either over the whole area (a layer 50 millimeters (2 inches) deep mixed into the top 150 millimeters (6 inches) or in each planting hole, if the area is large.

Plants such as ivy, pachysandra, and periwinkle should be planted on 300 millimeter (1-foot) centers; large plants such as juniper can be spaced on 1 meter (3-foot) centers.

Mulching -The soil between trees and shrubs must be planted with cover vegetation or must be mulched. When establishing ground covers, it is not desirable to plant species that will compete strongly with the ground cover or will make maintenance difficult. A thick, durable mulch such as shredded bark or wood chips is recommended to prevent erosion and reduce weed problems. Pre-emergent herbicides may be necessary where weeding is not practical.

On slopes where erosion may be a problem, jute mesh or excelsior blankets may be installed prior to planting, and plants tucked into the soil through slits in the net. Such plants should be put in a staggered pattern to minimize erosion.

Maintenance

Trim old growth as needed to improve the appearance of ground covers. Most covers need once-a-year trimming to promote growth. Maintain mulch cover with additions of mulch where needed. Fertilize as described above, every 3 to 4 years.